

SV-T30 Commercial

Heavy-lift Multirotor UAV

English technical reference prepared from the Chinese product document. Legacy contact details have been removed. Numeric values marked [verify] require confirmation before ordering or operation.

****Product Manual: SV-T30 Tethered Multirotor UAV****

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****SV-T30 Tether System Remote Controller****

****Functions and Types of Joysticks, Switches, and Knobs****

*** **Control Sticks (Yaw, Throttle, Roll, Pitch)****

Default configuration: Left-hand throttle (throttle auto-centers), Mode 2 (American hand).

*** **Power Switch****

Turn the remote controller on/off. Press and hold the switch for 2-3 seconds to turn on/off.

*** **Channel Switch Key (0)****

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****Product Description and Operation Guide****

****2. T30 Tethered Aircraft****

****2.1 Aircraft Specifications****

If, during subsequent flights, the aircraft still exhibits significant lateral drift after taking off in Attitude Mode, it is recommended to re-perform the level calibration.

| No. | Item | Content |

| :- | :-- | :----- |

| 1 | Wheelbase | 2050mm |

| 2 | Open Dimensions | 1570mm x 1570mm x 715mm |

| 3 | Folded Dimensions | 785mm x 860mm x 775mm |

| 4 | Weight | 36kg |

****Power System****

| No. | Item | Content |

| :-- | :--- | :----- |

| 1 | Number of Motors | 8 |

| 2 | Max Output Power (Single Motor) | 30kW [verify] |

| 3 | Rated Thrust (Single Motor) | [verify] |

| 4 | Rated Payload | [verify] |

****Electronic Speed Controller (ESC)****

| No. | Item | Content |

| :-- | :--- | :----- |

| 1 | Rated Current | [verify] |

| 2 | Rated Voltage | 500V [verify] |

****Propeller****

| No. | Item | Content |

| :-- | :--- | :----- |

| 1 | Diameter/Pitch | 32 x 12 inch |

| 2 | Material | Carbon Fiber Composite |

****Remote Controller Stick Definitions****

* Aileron

* Elevator

* Return to Home (RTH)

****Flight Mode Switch (A)****

Left, Center, Right positions correspond to: Attitude Mode, GPS Mode, GPS Mode. (Can be used for switching failsafe/low voltage protection).

****Return to Home (RTH) Mode Switch (B)****

Corresponding modes: Pending Mode (button light off, default), RTH Mode (button light on).

****2.6 Arming and Disarming****

* **Armable Modes:** Altitude Hold Mode / Position Hold Mode

* **Disarmable Modes:** Can be disarmed in any flight mode.

****Arming (Inner Eight)****

Pitch stick full down, throttle stick minimum, yaw stick full right, roll stick full left. The status indicator changes from flashing to solid, indicating arming is successful.

****Arming Requirements:****

System self-check is normal, satellite positioning status is achieved, indicator light is green single flash or fast flash.

****Disarming (Outer Eight)****

Pitch stick full down, throttle stick minimum, yaw stick full left, roll stick full right. The aircraft disarms immediately, and the indicator light starts flashing, indicating disarming is successful.

Alternatively, after landing, pull the throttle stick fully down and hold for 3 seconds to disarm.

****2.7 Compass Calibration****

Magnetometer calibration makes the aircraft heading more accurate. The magnetometer needs to be recalibrated when flying in different environments or regions to ensure the flight controller adapts to the local magnetic field. Calibration method for the Boying industrial flight controller magnetometer:

1. Quickly toggle the "Mode Channel" switch more than 6 times. When the status indicator flashes red and blue alternately, it indicates entry into magnetometer level calibration mode.
2. Hold the aircraft level and rotate it smoothly 360°. Wait for the green light to become solid. Level calibration is complete.
3. Point the aircraft nose vertically downward. Wait for the red and green lights to cycle flash, indicating entry into magnetometer vertical calibration mode.
4. Rotate the aircraft smoothly 360° again. Wait for the status indicator to stop flashing and the blue light to become solid. Vertical calibration is complete.

5. The flight controller will automatically restart.

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****Operation Diagram****

Refer to the diagram.

If flying at a location more than 50 km from where the magnetometer was last calibrated, level calibration must be performed again.

* Horizontal Rotation 360°

* Vertical Rotation 360°

2.8 Level Calibration

The level calibration function is mainly used to correct installation errors. Place the aircraft on a level surface. In the calibration settings page, click "Level Calibration" to complete.

* Common Settings

* Safety Settings

* Motor Settings

* RC Settings

* Controller Calibration

2.9 Indicator Light Description

No.	Light Status	Description
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:-	:-----	:-----
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1	Light Off	Light fault or updating firmware
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2	Red/White Alternating Flash	Flight controller initializing
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3	Red/Yellow/Blue/Green Alternating Flash	Device not calibrated
---	---	-----------------------

4	Red/Blue Alternating Flash	Device calibrating or testing
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5	Yellow Single Flash	Remote controller fault, low voltage level 1
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6	Yellow Fast Flash	Low voltage level 2 protection
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7	Magenta Single Flash	Compass fault
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8	Magenta Double Flash	Accelerometer fault
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9	Magenta Fast Flash	Other faults before arming
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10	Red Solid	Log storage device fault
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11	Red/Yellow Alternating Flash	GPS fault
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12	Single Flash / Solid	No GPS
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13	Green Single Flash / Solid	GPS acquired, not armed / armed
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14	Green Fast Flash	GPS high-precision positioning
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15	Fault Status	Remote controller, compass, accelerometer, motor test, ESC calibration. Action performed is forced landing or initialization not complete.
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2.10 First Flight

For the first flight, it is recommended to follow the steps below for pre-flight checks and flight to ensure safety.

****Pre-flight Check****

Please check the following to avoid flight accidents.

1. Check that the power supply and all peripheral connections to the flight controller are correct.

2. Start the ground station software (Boying Ground Station).

3. Turn on the RC remote control equipment.

4. Power on the aircraft system and establish a link with the ground station.

5. Calibrate the remote controller. If already calibrated, skip this step.

6. Calibrate the ESCs (do not install propellers). If already calibrated, skip this step.

7. Open the motor test function in the ground station to ensure motor rotation direction and motor number match the configured frame type.

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8. Calibrate the accelerometer. If already calibrated, skip this step.

9. Calibrate the magnetometer. If already calibrated, skip this step.

10. Set the flight modes.

11. Set the failsafe protection.

12. Check the ground station for warning messages, analyze the cause, and resolve.

13. Check if key data is normal, such as attitude data, heading data, GPS data. Move the airframe and observe if data changes are normal.

14. Check the GPS installation direction and ensure it is secure.

15. Check the flight controller installation direction and vibration damping.

16. Check motor rotation direction and propeller installation direction, and ensure they are securely installed.

17. Toggle the flight mode switch and observe if the flight mode display area in the ground station switches correctly.

After flight, check if the temperature of the clockwise-rotating motors and counter-clockwise-rotating motors is consistent. If the temperatures are inconsistent, it may indicate an unbalanced load on the aircraft. The propeller plane needs to be calibrated to ensure all propeller planes are consistent.

****3. Safety Settings****

****Protection Settings****

* ****Return to Home (RTH):**** RTH is an important protection method for safe flight. The RTH process involves the aircraft autonomously returning to the Home point from its current position.

* ****Remote Controller Failsafe:**** Irreplaceable. To ensure UAV flight safety while considering actual operational needs, Boying industry has designed a relatively complete remote controller safety protection strategy. Although flight controller functions are becoming increasingly intelligent and complete, from a safety perspective, current remote controller operations for UAV missions still have failsafe actions that can be set via the ground station software. It should be noted that the "Continue Mission" option for remote controller failsafe is only applicable to "Fully Autonomous Mode". Manual modes (Altitude Hold, Position Hold) have failsafe protection enabled by default and cannot be disabled.

* ****Data Link Protection:**** This function can be set to Disabled, RTH, or Continue Mission. In manual modes, the remote controller protection will be executed by default. To achieve Beyond Visual Line of Sight (BVLOS) autonomous operations, many industry applications require BVLOS flight. In this case, data link protection is particularly important. Users can set the remote controller protection to "Continue Mission" based on actual needs, and configure the data link protection to Disabled, RTH, or Continue Mission according to mission requirements.

****Flight Limitations****

* ****Geofence (Cylindrical):**** The cylindrical geofence can be set to Enabled, Partially Enabled, or Disabled via the ground station. Cylindrical area restriction parameters are as follows:

* Area Limit Enable: When disabled, there are no altitude or radius limits. When enabled, the set values apply.

* Protection Type: Altitude / Radius / Altitude + Radius.

* Protection Action: Can be set to Hover or Notify Only. Default is Hover.

* Max Altitude: The altitude limit for the area restriction. Upon reaching the protection altitude, the aircraft cannot be commanded to climb further but can descend.

* Max Radius: The radius distance from the center point where the aircraft was positioned and armed.

* When the flight triggers the maximum flight radius, the aircraft will enter a hover. Reducing throttle to descend more than 1m or switching flight modes can regain control authority.

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* ****No-Fly Zones:**** No-fly zones can be enabled via the ground station. After enabling and successfully updating the no-fly zone data via the APP, all no-fly zones within a 50 km radius centered on the aircraft's position will be displayed on the map. The aircraft cannot be armed inside a no-fly zone. If flying outside a no-fly zone and approaching one, the aircraft will trigger a hover and cannot proceed forward.

****4.1 First Flight****

For the first flight, it is recommended to follow the steps below for pre-flight checks and flight to ensure safety.

****Pre-flight Check****

Please check the following to avoid flight accidents.

1. Aircraft nose direction.

2. GPS/Compass module orientation.

3. Main controller installation direction.

4. Whether each rotor rotation direction matches.

5. Whether all electrical connections are secure.

6. The tether cable accepts 380V AC power. Open the winch switch on the tether box and pull out the tether cable.

7. Connect the aviation plug on the aircraft to the aviation plug on the tether box. Secure the strain relief buckle to the aircraft.

****Power-On Self-Test****

The power-on check steps are as follows. Refer to the "Indicator Light Description" for the meaning of the LED status indicator.

* **Step 1:** First, turn on the remote controller, then connect the main flight controller power.

* **Step 2:** Observe the LED status indicator. Ideally, wait until the GPS/Compass module has acquired sufficient satellites for positioning before proceeding to the next step.

* **Step 3:** Toggle the flight mode switch back and forth, and observe if the LED flight mode indication matches the switch position.

* **Step 4:** Place the aircraft at least approximately 20 meters away from the operator and wait for the flight control system to acquire satellites normally (red flashing light turns to green flashing light).

* **Step 5:** Turn on the backup power switch on the aircraft. Ensure the backup power is connected to the aircraft, then turn on the 500 VDC switch on the tether system.

* **Step 6:** In Attitude Mode, move both control sticks on the remote controller to the bottom right corner simultaneously to arm the motors. Then start motors sequentially starting from Motor 1. If the throttle stick value exceeds 20% during the sequential start process, all motors will start immediately.

* **Step 7:** After all motors have started, gently push the throttle stick to approximately 30% and hold. Slightly apply roll and pitch stick inputs and observe if the motor acceleration trend matches the stick input. If consistent, return the roll and pitch sticks to center, continue pushing the throttle until the aircraft lifts off.

* **Step 8:** Test the feel of each control channel at an altitude below 2 meters. If the response is normal, you can continue to explore the flight controller's maximum potential.

After flight, check if the temperature of the clockwise-rotating motors and counter-clockwise-rotating motors is consistent. If the temperatures are inconsistent, it may indicate an unbalanced load on the aircraft. The propeller plane needs to be calibrated to ensure all propeller planes are consistent.

****4.2 Failsafe Protection****

After the remote controller signal is lost, the LED indicator first becomes: (2)... (). After hovering for 5 seconds, the aircraft will return to above the takeoff point, land, and disarm. If the remote controller signal is restored during this process, the aircraft will continue executing the automatic RTH. To interrupt the RTH action, the remote controller flight mode switch must be toggled at least once.

****4.3 Power Loss Protection****

If the generator malfunctions and stops working, or the tether box malfunctions and stops supplying power to the aircraft, the aircraft initiates power loss protection and will land vertically in place.

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****3. Ground Tether Box System****

****3.1 Ground Tether Box Specifications****

No.	Item	Content
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1	Automatic Tether Box Weight	70 kg
2	Generator-Powered Flight Time	8 hours
3	Tether Box Dimensions	6060 [verify] x [verify] x [verify] mm
4	Rated Input Voltage	380 V AC, 50 Hz
5	Rated Output Voltage	500 V DC
6	Rated Output Power	30 kW
7	Tether Cable Length	60 m [verify]
8	Automatic Cable Retraction/Extension Speed	[verify]

****3.2 Ground Tether Box External Function Diagram****

No.	Name	Function
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1	Rotary Knob Switch	Locks the tether box top cover
2	Exhaust Fan	Cools the tether box
3	Voltage Display Meter	Displays the current tether box output voltage
4	Current Display Meter	Displays the current tether box output current
5	500V Power Switch	Press the button, the tether box outputs 500 VDC to power the aircraft
6	Automatic Cable Retraction/Extension System Switch	Activates the automatic cable retraction/extension system

- | 7 | Cable Length Display Screen | Displays the length of cable currently pulled out by the aircraft |
- | 8 | Main Power Switch | Main switch for the tether box |
- | 9 | Protective Cover | Protects the aviation plug. Turn clockwise to open the protective cover, turn counter-clockwise to lock it. |

****3.3 Ground Tether Box Operation Sequence****

1. Connect the tether box to the mains 380V power supply.

2. Press the main power switch button on the tether box.

3. Press the automatic cable retraction/extension system switch.

4. Pull out the tether cable from the box. Connect the aviation plug on the tether cable to the aviation plug on the tethered aircraft.

5. Ensure the aviation plugs are securely connected, then press the 500V power switch. Check if the main current display and voltage display are normal.

6. Once everything is normal, the aircraft can take off.

(If you have any doubts about the safety of this product, please contact our company for a technical inspection.)

****Disclaimer****

Users must read this manual carefully before using this product. Using this product implies acceptance and acknowledgment of all contents of this statement.

This product is suitable for persons aged 18 years and older. Under normal power supply and correct connections, it can provide users with an excellent flight experience. When using this aircraft system to debug parameters or perform firmware updates, we strongly recommend removing the propellers and ensuring normal power supply and correct wiring of the corresponding functional modules. Always keep away from crowds, hazardous materials, and fragile items when using. Shuangjie Technology assumes no liability for personal injury or property damage caused directly or indirectly by the following reasons:

1. User failure to assemble and use according to the instructions in this manual.

2. User operating the aircraft under the influence of alcohol, drugs, fatigue, or other impaired physical or mental states.

3. User actively or intentionally operating the aircraft to cause harm.

4. User disassembling the product themselves, or using non-Shuangjie Technology parts to modify the product, rendering it unable to function normally.

5. Injury caused by user operational error or subjective judgment error.

6. Injury caused by abnormal aircraft operation due to natural wear, circuit aging, etc.

7. Injury caused by user operating the aircraft while knowing it is in an abnormal working state.
8. User operating the aircraft under severe weather conditions such as typhoons, hail, heavy fog.
9. User flying in areas with magnetic interference, radio interference, or government-designated no-fly zones.
10. User flying the aircraft in conditions of poor visibility or obstructed line of sight.
11. Infringement caused by user obtaining any data, images, etc., using this product to operate the aircraft.

12. Other losses not within the scope of Shuangjie Technology's responsibility.

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